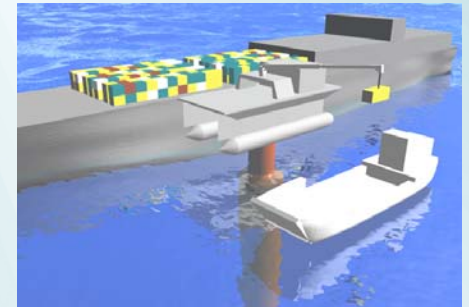
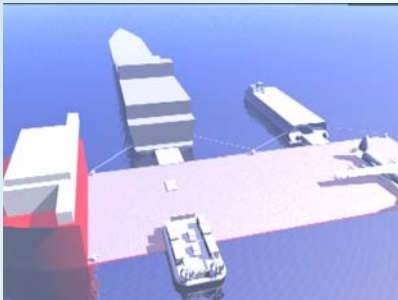




Center for Innovation in Ship Design



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NSWC-CD 22

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Charter

People

- Educate and develop the next generation of naval engineers

Knowledge

- Advance the theory and practice of ship design
- Explore new and innovative ways to develop naval ships

Innovation

- Provide an environment to develop and assess innovative ship technologies & concepts quickly

Charter signed 17 Oct 2002 by CNR, NAVSEA 05 & NSWC



- ✓ Funded through ONR NNR-NE Program & NAVSEA
- ✓ Located at NSWC Carderock
- ✓ Transition opportunities through NAVSEA programs & marine industry/university partners



CISD Vision:

To Develop and Sustain World-Class Innovative Naval Ship Designers with the Knowledge and Tools to Create the Navy of the Future

Knowledge and People Create the Affordable, Mission Capable Navy of the Future

CISD Mission:

Ensure the Future Capability (People, Tools and Knowledge) of the Nation to Develop Innovative Ship Designs to Effectively Meet Defense Needs

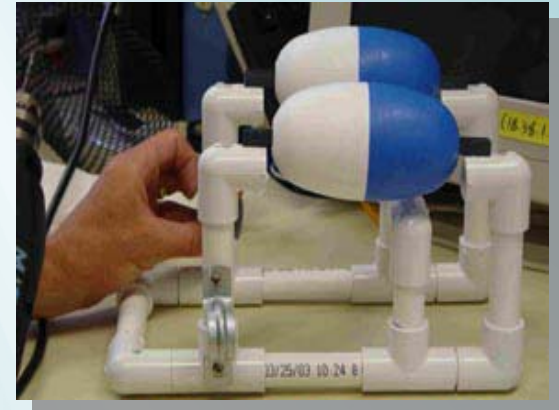
- Revitalize and Sustain Naval Engineering Education in the US by Supporting ONR's Implementation of the National Naval Responsibility for Naval Engineering (NNRNE).
- Develop Ship Designers that Create Innovative Ship, Surface/Sub-Surface Unmanned Vehicle and Submarine Designs to Affordably Meet National Defense Capabilities.
- Revitalize and Sustain the Technology Base to Support Naval Engineering Education and Innovative Ship, Surface/Sub-Surface Unmanned Vehicle and Submarine Design.



Strategic Focus Areas

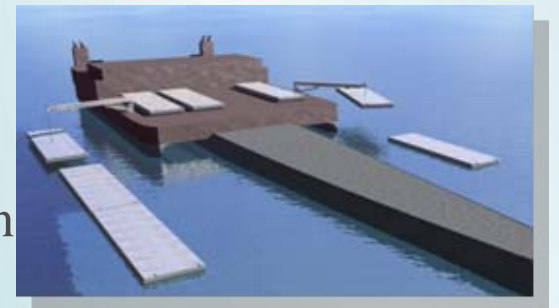
People (Human Capital) Development

- Ship Designer Development
- Naval Research Enterprise Intern Program
- Visiting Faculty Program
- Middle & High School Outreach
- Professional & International Exchange



Innovative Concepts Development

- High Risk Ideas / “Out-of-the-Box” Concepts
- Strategic Concepts Development
- Learn by Doing Concepts
- Ship & Ship Systems Technology Needs & Evaluation





Strategic Focus Areas (continued)

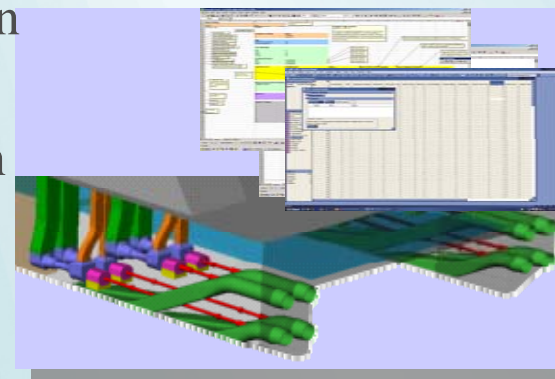
Ship Design Knowledge Base

- Capture/Share Ship Design Practices, Lessons Learned
- Use Knowledge Base Technology
- Communicate State-of-the-Art Ship Design Knowledge



Ship Design Tools, Methods & Criteria

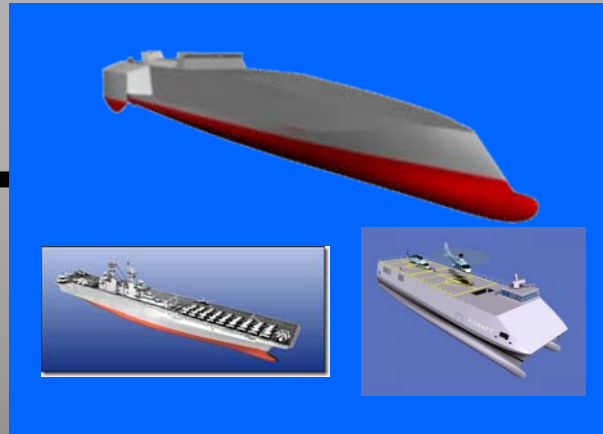
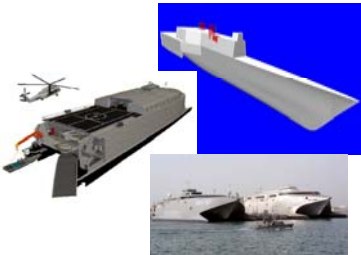
- State-of-the-Art Naval Architecture Science and Design Tools Development
- Design Tool Transition / Implementation / Introduction
- Develop Methods, Tools, & Processes to Quickly Create & Assess Ship Concepts



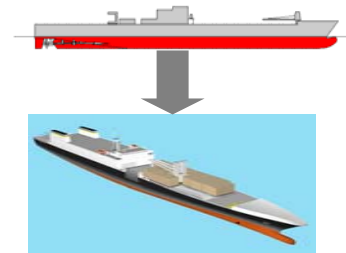


CISD Ship Design Innovation Cells:

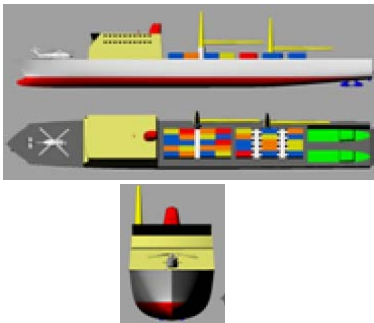
High Speed Small Naval Vessels – Technology Needs



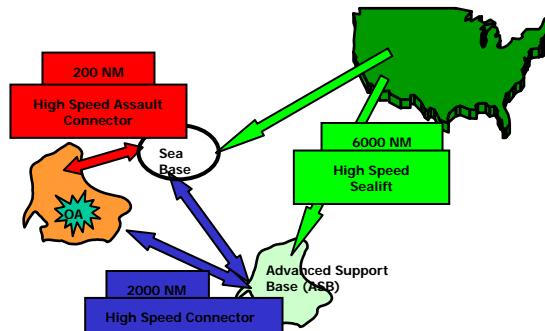
Rapid Sea Lift Ship Concept Studies



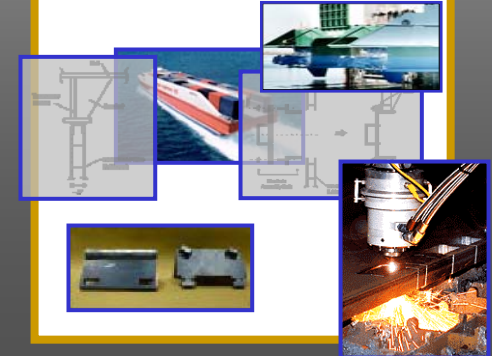
Global Fleet Station Concepts



Sea Connector Force Architecture



Light Weight Total Ship Architecture



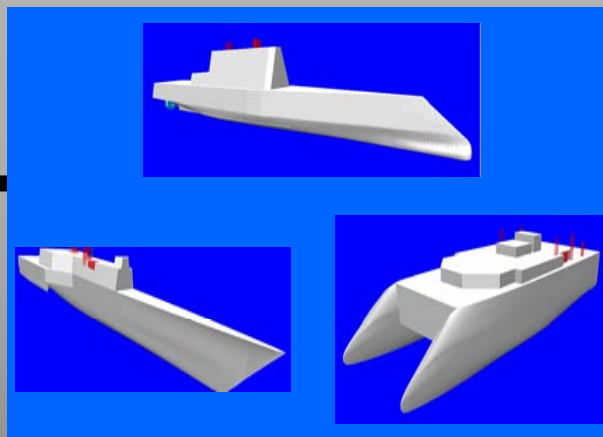
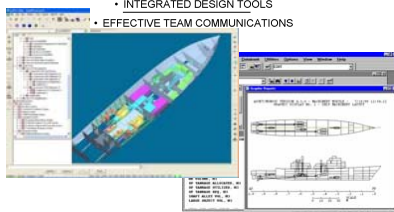


CISD Design Tools Innovation Cells:

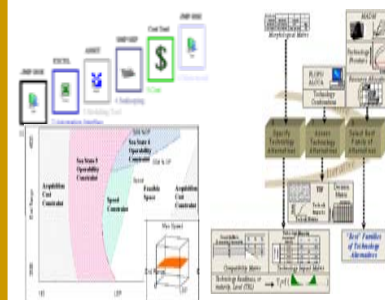
Ship Design Capability Readiness Model



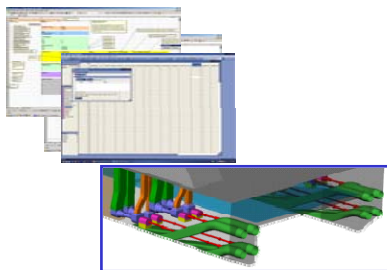
- EXPERIENCED PEOPLE
- DOCUMENTED PROCESSES
- SPECS, STANDARDS & CRITERIA
- INTEGRATED DESIGN TOOLS
- EFFECTIVE TEAM COMMUNICATIONS



UTE- TIES for Small Fast Surface Ships

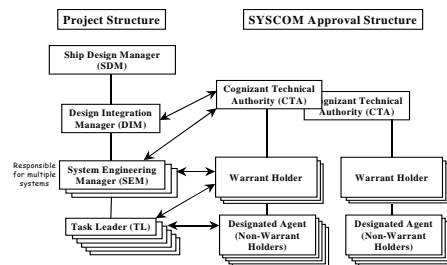


High Speed Ship Tools – Ship Synthesis Models & Performance Analysis



Ship Design Approval Process Development

Mapping Project Structure to the SYSCOM Approval Structure



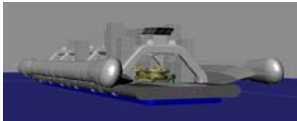
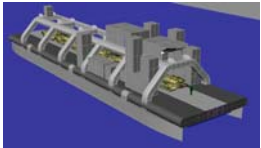
High Speed Ship Tools & Criteria





CISD Seabasing Innovation Cells:

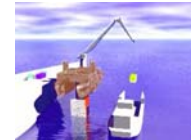
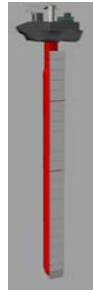
T-Craft



Rapidly Deployable Stable Platform



- SMALL CATAMARAN HULL WITH DETACHABLE SPAR PROVIDING SMALL WATER-PLANE AREA
- CAPABLE OF 555 CRANE OPERATIONS

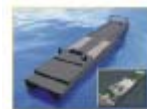


Seaplanes



- USE 'ITS' TO LOAD & UNLOAD CARGO/ PERSONNEL AT SEABASE
- WITH BOW DOOR CAN BE USED TO LOAD & UNLOAD CARGO FROM BEACH
- 60,000 LBS PAYLOAD
180 TROOP CAPACITY
CAN CARRY ISO CONTAINERS OR VEHICLES

Seabase Hub & Intermediate Transfer Station



Advanced Logistics Delivery System

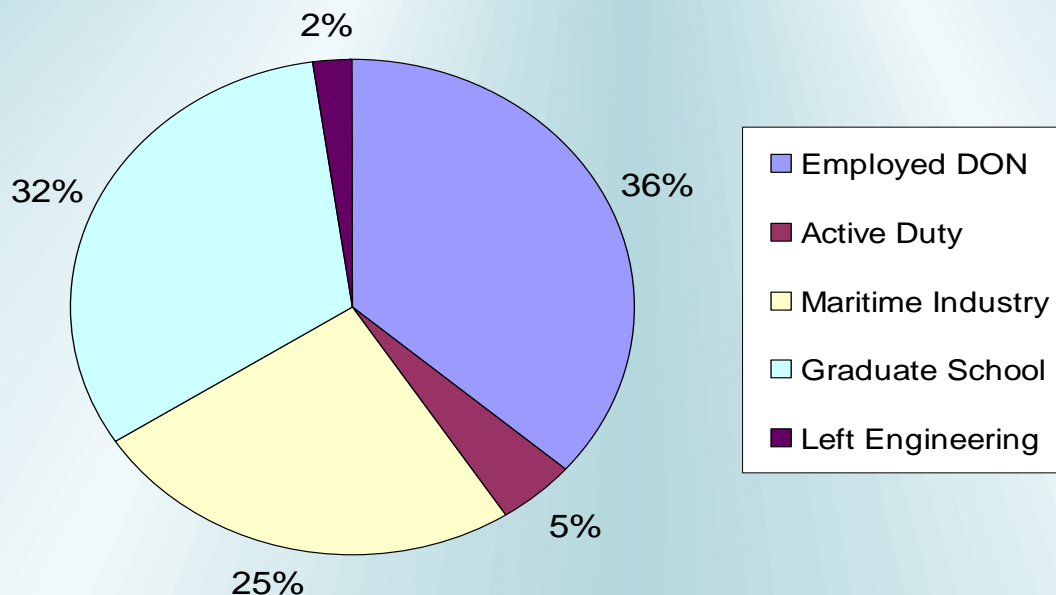


- 1000 LBS PAYLOAD
- LAUNCHED FROM VESSEL AT 500 KNOTS
- WINGS INFLATE AND VEHICLE GLIDES TO TARGET
- RANGE IS 50 NM
- DELIVERY OF 15 TONS PER HOUR



CISD People Successes

2004-2007 CISD Interns, where are they now?



2008 Student Interns (27 Summer Students)

- 6 Offers made to graduating seniors from 2007 intern class
- 4 accepted full-time positions in NAIP or NSWCCD SEDP

2009 Student Interns, where will they be????



People

NRE Interns

Disciplines	2003	2004	2005	2006	2007	2008
Totals	13	36	14	14	22	27
Naval Engineering	8	23	7	10	15	23
Other Engineering	3	8	7	4	6	2
Graduate Students	2	5	0	0	1	2

Navy Acquisition Intern Program & NSWCCD S&E Development Program

Naval/Other Engineering	6	3	0	1	5	3
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Guest Professors

Naval Engineering	6	3	0	0	0	1
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Science and Engineering Apprentice Program

High School Students	6	3	0	0	0	0
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International Exchange Programs

UK DESG Graduates	4	4	3	2	3	4
UK Exchange Officer	1	1	1	1	1	1
Canadian Exchange Off	1	1	1	1	1	1



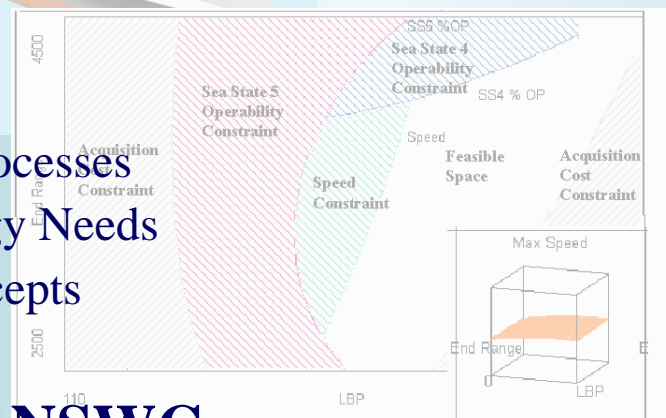
Center of Innovation in Ship Design is:

The hub of a national collaborative enterprise combining the best ideas and experience of government, industry, and academia in ship design

CISD Mission: Ensure the Future Capability (People, Tools and Knowledge) of the Nation to Develop Innovative Ship Designs to Effectively Meet Defense Needs

Focus Areas: Navy of the Future

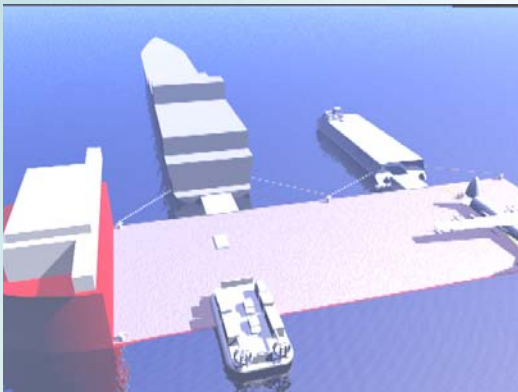
- Develop Future Ship Designers
- Knowledge Base / Design Tools & Processes
- Future Ship & Ship Design Technology Needs
- Develop Innovative Ship Design Concepts



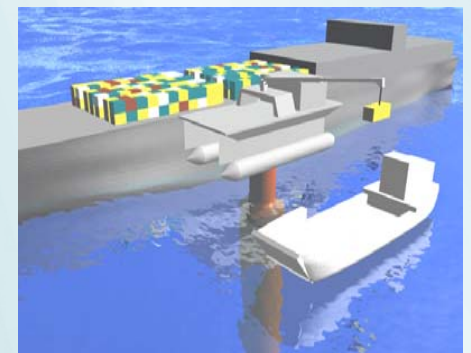
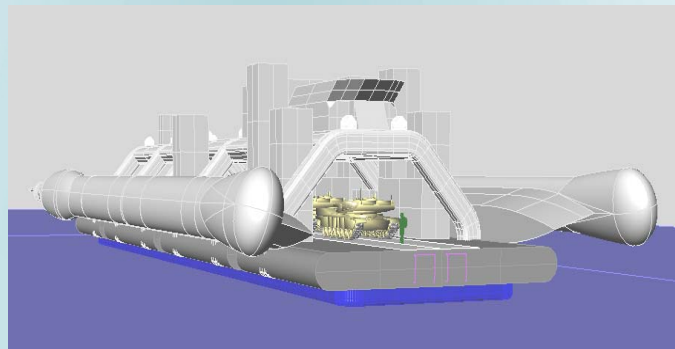
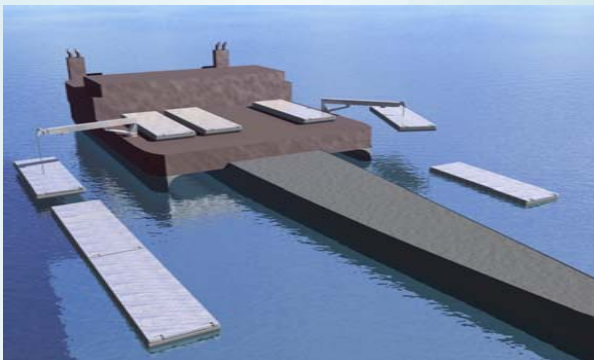
Chartered by ONR, NAVSEA 05 & NSWC



Center for Innovation in Ship Design



Questions





Backups



CISD Innovation Cells:

Center activities include:

- Focused, 2-12 month projects
- Teams with government, academia and industry
- Exploring innovative ship design capabilities and techniques
- Educational and professional development opportunities
- Emphasizing intern/mentor relationships

Enabling Participating Organizations to ...

- Gain early access to new ship development tools & techniques
- Influence and guide government and university ship design research agenda
- Take part directly in ship design projects with government, academic and industry experts
- Influence requirements setting process for future ship designs



CISD 2008 Projects:

Experimental & Technologies

- DUKW21 Demonstration – Scaled Demo of DUKW21 ISO container carrier
- Surf Characterization – Characterize surf zone and quantify ship motions
- MOSES Demonstration – Scaled demo of MOSES inflatable causeway concept
- 2-Body Motions – Experimental modeling of multi-body motions in SS

Ship Concept Designs

- Global Fleet Station Concept Study
- Future Amphibious Ship Concept Study
- Transformable Heavy Lift Ship, Redux
- Littoral Reconnaissance Ship Concept Study
- Utility Craft Concept Study

System Designs

- SAUSAGE – Depth, Speed Recorder
- Floating Compliant Heliport Design
- Mulberry 21 – Development of a Mulberry harbor for the 21st Century



CISD 2007 Projects:

Experimental & Technologies

- Biofouling & Design of a Biomimetic Hull-Grooming Tool
- An Investigation of Flow Visualization Techniques for Trimaran Hulls
- A Quantitative Cost Comparison of Seaplanes & Land Planes for Sea Base Operations
- Development of a High-Capacity, High Speed Sealift Hull Form
- Hybrid Agent Approach for Set-Based Conceptual Ship Design

Ship Design Processes / Human Capital

- Ship Design Capability Readiness Model (SDCRM)
- Ship Designer Human Capital Strategy
- Ship Design Knowledge Management System
- Student Outreach, including Sea Perch, National Student Leadership Conference
- Hosted Ship Design Planning Workshops

Ship Concept Designs

- Transformable Heavy Lift Ship
- DUKW 21 – Amphibious Cargo Transfer from Ship to Shore
- Rapidly Deployable Stable Platform (RDSP)
- Transformation Craft (T-Craft) Concept Study
- Ship Design Consultant for ONR Decontamination Ship Study

System Designs

- MOSES – Inflatable Causeway



CISD FY 06 Projects:

ONR Sponsorship

- Biofouling & Design of a Biomimetic Hull-Grooming Tool
- An Investigation of Flow Visualization Techniques for Trimaran Hulls
- A Quantitative Cost Comparison of Seaplanes & Land Planes for Sea Base Operations
- Transformable Heavy Lift Ship
- DUKW 21 – Amphibious Cargo Transfer from Ship to Shore
- MOSES – Inflatable Causeway
- Development of a High-Capacity, High Speed Sealift Hull Form
- Transformation Craft (T-Craft) Concept Study
- Hosting Portion of National Student Leadership Conference
- Ship Design Consultant for Decontamination Ship Study

University Teamed

- FAU - Rapidly Deployable Stable Platform (RDSP)
- U. Michigan - Hybrid Agent Approach for Set-Based Conceptual Ship Design

NAVSEA 05 Sponsorship

- Ship Design Capability Readiness Model (SDCRM)
- Ship Designer Human Capital Strategy
- Ship Design Knowledge Management System
- Hosted Ship Design Planning Workshops



CISD 2006 Projects:

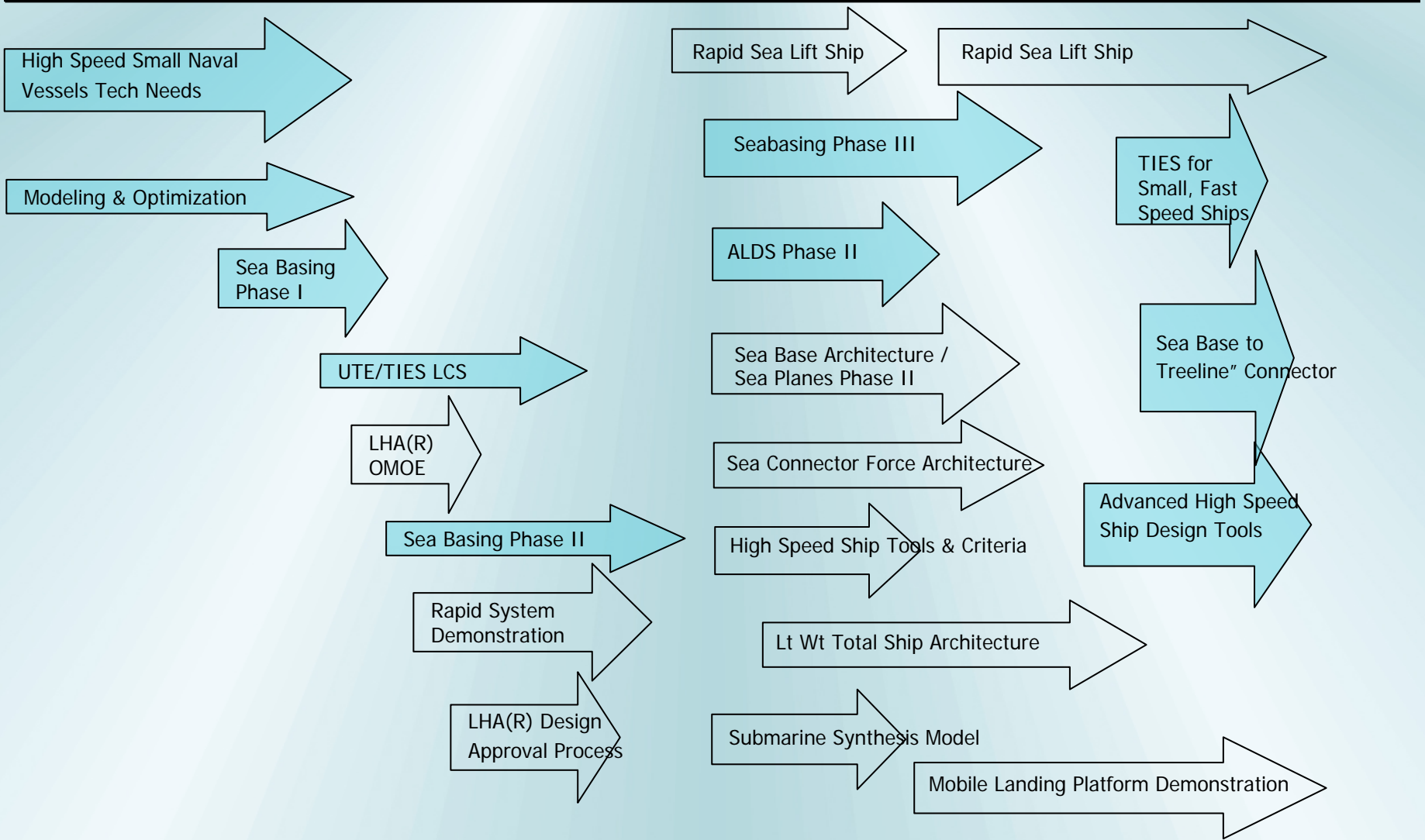
Experimental & Technologies

Ship Concept Designs

System Designs



2002												2003												2004												2005											
AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC							





CISD FY 05 Projects:

Innovation Cells

- TIES Process Development for Small Fast Ships
 - ONR Sponsorship (1 NREIPs, 2 NNR-NE Interns)
- Advanced High Speed Ship Design Tools
 - ONR Sponsorship (1 NREIPs)
- Sea Base to the “Treeline” Assault Connector & Technologies
 - ONR Sponsorship (2 NREIPs, 1 NNR-NE Intern)
- Mobile Landing Platform (MLP) Full Scale Demonstration Team
 - MPF(F) (PMS 325) Sponsorship (6 NREIPs)

Design Tools & Processes

Innovative Designs & Technology Needs

Studies – Study Support

- Design Tools Development & UTE-TIES for JHSV AoA Support
 - NAVSEA 05D & PMS 325 Sponsorship
 - UTE-TIES efforts tentative
- Team Member for Rapid Strategic Lift Ship (RSLs) Feasibility Study
 - NAVSEA 05D & PMS 325 Sponsorship (1 NREIP part time)
- Alternative Commercial Uses of MLP Ship Study
 - ONR Sponsorship

Transition to Design & Acquisition

Outreach Efforts

- Hosting Portion of National Student Leadership Conference
 - ONR Sponsorship



CISD FY 04 Projects:

Innovation Cells

- Seabasing Phase III
 - ONR Sponsorship
- Advanced Logistics Delivery System - Phase III
 - ONR Sponsorship
- Sea Base Architecture / Sea Planes – Phase II
 - NAVSEA 05D Sponsorship
- Light Weight Total Ship Architecture
 - NAVSEA 05D Sponsorship
- Sea Connector Force Architecture
 - NAVSEA 05D Sponsorship
- Submarine Synthesis Model
 - NAVSEA 05U Sponsorship
- High Speed Ship Design Tools & Criteria
 - NAVSEA 05D Sponsorship

Innovative
Designs &
Technology
Needs

Design Tools &
Processes

Studies – Study Support

- Rapid Strategic Lift Ship (RSLs) Concept Study
 - NAVSEA 05D & PMS 325 Sponsorship
- Concept Design Studies Support to On-Going Ship Designs
 - NAVSEA 05D

Transition to
Design &
Acquisition

Outreach Efforts

- Hosting Portion of National Student Leadership Conference
 - ONR Sponsorship